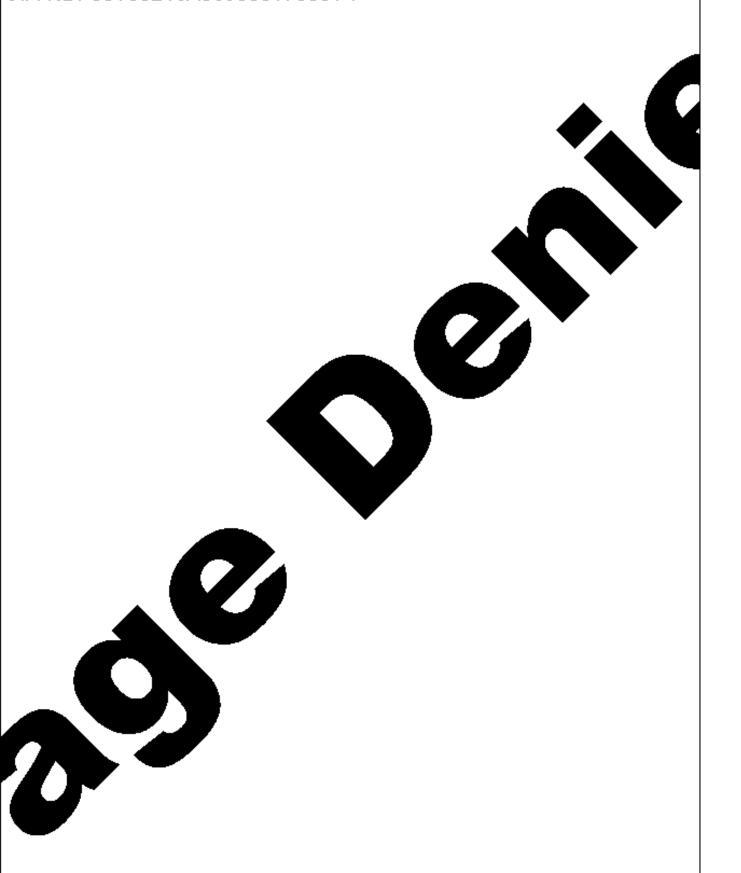
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COUNTRY USSR

Description and Operating

Instructions for Hoisting and Retracting DF Loop on Submarines REPORT

DATE DISTR. 19 September 1963

NO. PAGES

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REFERENCES

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DATE OF INFO.

**SUBJECT** 

PLACE & DATE ACQ

THIS IS LINEVALUATED INFORMATION. SOURCE GRADINGS ARE DEFINITIVE. APPRAISAL OF CONTENT IS TENTATIVE.

English-language Soviet manual 50X1-HUM 1. entitled Frame Aerial Mast Hoisting Assembly: Description and Operating Instructions The manual contains 26 pages plus eight drawings. No date or publishing data 50X1-HUM appear.

- The hydraulic hoist is designed to raise and lower a direction-2. finder loop on submarines. It may be operated while the submarine is surfaced or submerged at depths to 35 meters, in moderate sea conditions, at speeds up to four knots.
- No technical data are given for the DF loop. .... 3.

Distribution of Attachment (For Retention):

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|                            | DESCRIPTION AND OPERATION                        | NG INSTRUCTIONS   |
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# Frame Aerial Mast Hoisting Assembly

DESCRIPTION AND OPERATING INSTRUCTIONS

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#### I. GENERAL

#### A. Purpose

The mast hoisting assembly is designed to raise and lower the frame aerial with the submarine in surface condition, at speeds of up to 4 knots and moderate sea condition, as well as in submerged condition at periscope depth and at depths of up to 35 metres (by the depth gauge), the maximum allowable submerged speed being 4 knots.

The mast should not be raised and retained in the upper position in the following cases:

- (a) in surface condition, with sea above moderate;
- (t) at periscope depth with sea above moderate and speed over 4 knots;
- (c) at depths of up to 35 metres and speed over 4 knots.

  The aerial mast is raised and lowered by means of a hydraulic hoist operated through a manipulator.

The device is located in the ship's centre line between frames 61 and 62.

## B. Specifications

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#### II. DESCRIPTION

#### A. General

The frame aerial mast hoisting assembly (See Dwg No.1) comprises a telescopic mast and a raising and lowering mechanism.

Mast 7 is mounted in upper bearing 4 and in the body of upper head 10.

Secured to the mast top is frame aerial 1; aerial electric cable 8 is housed inside the mast tube.

The upper head is mounted on stanchion 9 of the pressure hull, and upper bearing 4 is fixed on a foundation in the conning tower cutwater.

Mast raising and lowering is performed by means of hydraulic hoist 12 accommodated inside the mast.

The hydraulic hoist is operated through manipulator 15 communicating with the submarine hydraulic system.

Hydraulic hoist 12 is designed as a single-acting hydraulic press.

The mast is raised by the pressure of oil fed into the hydraulic hoist cylinder through the manipulator from the pressure line. On completion of raising, the mast is retained in its extreme UP position by the oil inside the cylinder and, in addition, by the locking device of upper head 10.

During lowering, the mast by its own weight displaces the oil from the cylinder into the return line.

The UP and DOWN positions of the mast are indicated by light signals.

Guide bar 11 is designed to prevent the mast from rotating during raising and lowering.

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#### B. Description of Individual Units

## 1. Mast Guide Bearings

(a) Uppor Bearing 4 (See Dwg No.1). The cast-steel body of bearing 4 is provided with a flange having openings for fixing and fastening bolts by which the bearing complete with adjusting spacer 5 is secured to the foundation in the conning tower outwater.

The bearing body has an inside recess to accommodate pressed—in bronze guide bushing 6. Located on the bearing body top face is a second recess intended to house rubber shock absorber 2 which also serves as a stop during mast lowering. The bearing is lubricated by means of lubricator 3 mounted on a special boss on the bearing body.

(b) Upper Head (See Dwg No.2). Cast-steel body 16 of the upper head is provided with a flange having stud holes for fastening the head complete with packing gasket 21 to the pressure hull stanchion. Bronze bushing 17 serving as the mast guide is pressed into the upper part of the body which mounts also parts 18, 19, 20, 22 of the mast packing gland. The upper pair of gland cups is so arranged as to ensure self-sealing of the mast due to outboard water pressure. The bottom pair of cups provides forced sealing of the mast. These cups are tightened by the pressure of grease fed by a pressure lubricator.

Steel ring 27, acting as mast stop during raising, is located inside the upper head body, in its middle section.

In the body bottom part there is an outside recess accommodating the handwhool of the locking device designed to retain the mast in the UP position.

The locking device consists of handwheel 29, ring 28 secured to the body by bolts, and three elide blocks 25 which slide along pins 26 in the body guide openings.

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The slide blocks are hinged to the handwheel spokes so that when the handwheel is turned through the angle limited by plate 24 the slide blocks shift inside the body. When the mast is raised to the UP position, the slide blocks may be pulled out and positioned under the flange of the mast bottom head, thus forming a support for the mast.

The line feeding oil to the gland cups and to presume lubricator 23 is connected to the upper head by means of two lugs provided on the body. The lugs are threaded and have inside bored passages.

## 2. Telescopic Mast

(a) Mast (See Dwg No.3). Mast 34 is made of stainless steel. Its surface is ground. The mast bottom end is threaded and has a centring bore for receiving lower head body 42. Welded to the mast top end is flange 33 with bolt holes for securing the frame aerial along with gasket 31.

The body of flange 33 is provided with a rest shoulder for stopping the mast in the DOWN position.

Pipe union 30 screwed into the mast flange and provided with gasket 32 is designed to mount the gland of the electric cable lead-in.

(b) Lower Head. Cast steel body 42 of lower head with gasket 40 is attached to the mast by means of a thread having a centring bore. Stop screw 59 is designed to prevent the lower head body from self-loosening.

The body has a flange with a centring bore and blind holes for study 49 intended for securing the hydraulic hoist cylinder, and a second flange intended to mount rubber shock absorber 41.

In the body wall there is a threaded branch pipe with a recess for mounting parts 43, 44, 45 of the aerial electric cable lead-in gland.

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## 3. Hydraulic Hoist

(a) Cylinder. The hydraulic hoist cylinder consists of scamless steel pipe 39, forged steel bottom 38 and flange 48 wolded to the pipe end faces. Flango 48 serves to secure the cylinder to the mast lower head by means of the centring bore and gasket 46. Pipe 39 is welded to the flange skirt; the skirt has inside bores and is threaded for pressing-in bronze guide bushing 58 and for accommodating parts 54, 55, 56, 57 of rod gland cup.

Bottom 38 has a branch pipe and centring section to be welded to the pipe; besides, it serves as the cylinder guide during its installation into the mast.

The centre lines of bottom 38 and flange 48 are shifted relative to the mast centre line, thus providing ample space for the aerial electric cable, after the cylinder is mounted in position. The bottom has an opening for the electric cable to pass.

When the cylinder is being filled with oil, the air from it is evacuated through pipe 35 welded to cylinder bottom 38 and flange 48; the opening provided in flange 48 for the pipe union is closed from the outside by needle plug 62. Plug 61 is intended for testing the assembled mast for leakage.

- (b) Flange with Fork. Flange with fork 47 has a centring bore for fitting the hydraulic hoist cylinder onto the flange, and holes for study securing the cylinder to the mast lower head. Welded to the side surface of flanges 47 is the fork for guide bar 11 (See Dwg No.1) which prevents the mast from rotating.
- (c) <u>Plunger</u>. Steel hollow plunger 60 (See Dwg No.3) consists of two parts joined by welding. The plunger inner space serves to communicate the hydraulic hoist cylinder to the hydraulic system pips. The plunger top end is threaded from the outside to facilitate testing.

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Plunger shank 52 has flat facets for a nut wrench and two outside threads, intended for attaching flange 51 and for connecting the hydraulic system pipe.

Plunger flange 51 with adjusting spacers 50 is intended to connect and secure the plunger to the foundation.

The flange is provided with foundation bolt holes and a threaded centre hole for the plunger chank which is secured by locknut 53.

## 4. Guide Bar and Stop

The guide bar is designed to prevent the mast from rotating when being raised or lowered; the stop serves to retain the frame aerial when the mast is UP in a strictly definite position relative to the ship's centre line.

The top end of guide bar 67 (See Dwg No. 4) is secured by means of bracket 64 and adjusting spacer 63 to bosses 70 welded to the upper head body; the guide bar bottom end is inscrted into the bushing of the guide bar plate.

The guide bar plate consists of two parts which are welded together, i.e. plate 69 and bushing 68. The plate is provided with holes for stude securing the plate to the plunger flange.

The mast is prevented against rotating by means of flange with fork 47 (See Dwg No.3) which embraces the guide bar.

The stop consists of wedge 66 (See Dwg No. 4) mounted on the boss of the mast lower head body, and of wedge guide 65 located on brackets 64 of the guide bar.

By the end of mast upward travel, wedge 66 enters wedge guide 65, the maximum clearance between their surfaces being 0.025 to 0.085 mm, thus ensuring a strictly definite position of the aerial relativo to the ship's centre line.

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#### C. Auxiliary Systems



## 1. Gland Cup Tightening Pipe Line

The gland oup tightening line is connected to the upper head body and serves to tighten the cups of the mast gland by the pressure of grease fed from the pressure lubricator.

The line consists of straight-way cock 72(See Dwg No.5), pipe 74 and pressure lubricator 76. The pipe is connected to the cock by means of pipe coupling 73, and to the pressure lubricator by means of pipe union 75.

## 2. Three-Way Slide-Valve Manipulator

The manipulator (See Dwg No. 6) is designed to control the hydraulic hoist.

Located inside manipulator body 77 are channels for the passage of liquid and a recess for receiving axlc 78. The ends of axle 78 are of a square section to mount the control handle and cam 79 for shifting slide valve 80.

Axle 78 is sealed with three rubber rings 81.

Axle 78 is secured inside the body by means of pressing nut 82 and thrust ball bearing 83. Fitted inside the manipulator cover is valve 93 allowing to disconnect the pressure line from the hydraulic hoist, when the control handle is in the neutral or DOWN position.

The mast lowering speed is controlled by means of throttle valve 94 located inside the manipulator body. The mast raising speed is controlled by means of the handle stop.

To prevent the manipulator from being accidentally switched on, it is equipped with a looking device consisting of two eyes 96 and a look. The manipulator handle can be placed in three alternative positions which are shown by the pointer on indicator plate 97; these positions are:

(1) the hydraulic hoist cylinder communicates with the pressure line;

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- (2) the hydraulic hoist cylinder is disconnected from the return and pressure lines;
- (3) the hydraulic hoist cylinder communicates with the return line.

The first position corresponds to mast raising, the second - to hydraulic hoist standstill or mast remaining in the UP position, and the third - to mast lowering.

The manipulator is provided with a pipe union for receiving a pressure gauge.

## D. Signal Instruments and Devices

## 1. Upper Electric Contactor

Upper electric contactor 87 (See Dwg No. 7) indicates the beginning of lowering and the completion of raising of the mast; the contactor is secured to bracket 86 mounted on the boss of upper head body. The bracket comprises swinging lever 85 and a pusher protruding into the inside space of the upper head. During mast raising the flange of the mast lower head shifts pusher 84 and turns lever 85 which switches on electric contactor 87. During mast lowering, the same device switches off the electric contactor.

## 2. Lower Electric Contactor

Lower electric contactor 88 (See Dwg No.8) indicates the beginning of raising and the completion of lowering of the mast; the contactor is secured to bar 89 mounted on the bracket; the bar is provided with swinging lever 90 and roller 91.

During mast lowering, fork 92 fitted in the mast lower head presses off lever 90 which switches on electric contactor 88. During mast raising, the same device switches off the electric contactor.

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## 3. Socket

Socket 13 (See Dwg No.1) is designed to connect the cable length contained incide the telescopic mast to the cable loop secured inside the submarine pressure hull.

The sucket is fixed to the body of the mast lower head by means of lug 14.

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## III. OPERATING AND MAINTENANCE INSTRUCTIONS

#### A. General Supervision

The sliding parts of the hoist and especially the sliding surfaces of the mast and plunger require thorough every-day care. The ease and smoothness of mast lowering by gravity depends upon the degree of friction in the guide bearing and the glands of the mast and plunger. For this reason, keep the mast and plunger sliding surfaces clean and protect them against corrosion and other damage, thus reducing friction in the glands and guide bearing and ensuring the required degree of gland tightness.

Prior to starting operation, the hoist parts should be positioned as follows:

- 1. The telescopic mast should be in the extreme DOWN position (i.e. it should be lowered).
- 2. The manipulator handle should be in the neutral position.
- 3. The valves of the pressure and return lines should be closed.
  - 4. The mast stopping device should be disengaged.

## B. Preparing for Operation

- 5. Make sure that the hoist parts are positioned as required for starting.
- 6. By pressing the corresponding levers, check the performance of light signalling system contactors.

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- 7. Nake sure, by visual inspection, that the hoist is in good repair.
  - 8. Open the valves of the pressure and return lines.

e: The mast may be heisted when the submarine is at periscope depth or in surface condition, maximum speed being 4 knots and sea up to moderate, as well as at depths of up to 35 metres (by the depth gauge) and a maximum speed of 4 knots. Prior to raising the mast, make sure that there is no oil pressure in the gland cup tightening line; to this end, back out the pressure lubricator handle two or three turns and open the pipe line cook mounted on the mast upper head.

The mast should not be raised or retained in the UP position in the following cases:

- (a) at periscope depth, if sea force is above moderate and submarine speed over 4 knots;
  - (b) in surface condition, with sea above moderate;
  - (c) at depths of up to 35 metres, with speed over 4 knots.

## C. Raising the Mast

- 9. See that the shut-off valve located in the pipe connecting the cylinder and pressure gauge is open.
- 10. Shift the manipulator handle from the neutral into the UP position.
- 11. Check the mast for complete raising by the signal light.
- 12. By rotating the handwheel, switch on the mast stopping device.
- 13. Shift the manipulator handle into the neutral position.

In operating the hoist for a long time close the pressure and return line valves.

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## D. Lowering the Mast

- 14. Open the valves of the pressure and return lines if they have been closed.
- 15. Shift the manipulator handle from the neutral into the UP position and switch off the mast stopping device.
- 16. Shift the manipulator handle from the UP into the DOWN position.
- 17. Check the completion of mast lowering by the light signal.
- 18. On completion of mast lowering, shift the manipulator handle from the DOWN into the neutral position.
  - 19. Close the valves of the pressure and return lines.

### E. Maintenance during Short Periods

#### of Standstill

## Daily:

- 20. See to it that the hoist and especially the sliding surfaces of the mast and plunger are clean.
  - 21. Check the condition of the mast gland.
- 22. See to it that all the parts requiring lubrication are liberally greased; add grease into all the lubricators, when required.
- 23. Look the manipulator handle when in the neutral position.
- 24. Raise and lower the mast in order to check whether the entire assembly is in good repair.

# F. Maintenance during Long Periods of Standatill

#### Weekly:

25. Clean all the hoist parts from dirt and old grease and coat them with a layor of clean protective grease.

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26. Raise and lower the mast in order to check whether the entire assembly 18 in good repair.

The minimum allowable time of mast lowering from the extreme UP to the extreme DOWN position is  $30^{+2}$  sec.

27. Check the fastening of the frame aerial to the mast for proper scaling; to do so, inspect the mast inner space through the plug hole provided in the flange of the hydraulic hoist cylinder; also check the aerial fastening, clean the stude from rust, and grease them.

#### G. Troubles and Remedies

#### Trouble

- 1. Inflow of outboard water into mast.
- 2. 011 leakage through plunger gland.
- 3. Mast lowers too quickly due to wear of heist parts or to other reasons.

#### Remedy

- 1. Tighten nuts fastening aerial to mast, or replace packing gasket.
- 2. Replace cups of plunger gland, if damaged.
- 3. Adjust time of mast lowering to normal by means of manipulator throttle valve.

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## IV. DISASSEMBLY AND ASSEMBLY INSTRUCTIONS

#### A. General

- 1. Take all the required measures to prevent the outside finished surfaces of mast 34 (See Dwg No.3) and plunger 60 against being damaged.during disassembly and assembly.
- 2. Mark the mating parts, especially adjusting spacers 5 (See Dwg No.1) and 50 (See Dwg No. 3) intended for guide bearing 4 (See Dwg No.1) and flange 51 (See Dwg No. 3).

#### B. Disassembly

- 3. Check whether the mating parts are properly marked.
- 4. Remove frame aerial 1 (See Dwg No.1).
- 5. Disconnect electric cable 8 from socket 13 and sealing parts 43, 44 and 45 (See Dwg No. 3) in the mast lower head, and pull out the cable from the mast tube.
- 6. Lift the mast 0.5 metre above the DOWN position and secure it by a yoke.
  - 7. Remove guide bar 11 (See Dwg No.1).
- 8. Turn back the nuts of stude 49 (See Dwg No. 3) securing flange 48 of hydraulic hoist cylinder to the body of lower head 42, and slowly lower the cylinder.
- 9. Using a cord, secure shank 52 and plunger 60 against shifting inside the cylinder.
  - 10. Screw lower head 42 off the mast.
- 11. Fit the split-type erection sleeve on to the mast threaded end and coat it with grease, remove the yoke and

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carefully pull out the mast from guiding parts 4 and 10 (See Dwg No. 1).

- 12. Disconnect the hydraulic hoist plunger and the hydraulic system pipe, and drain the oil from the cylinder; air should be fed into the cylinder through needle plug 62 (See Dwg No. 3).
- 13. Romove the hydraulic hoist assembly from the foundation and place it on the tank top in the bilge beside the foundation.

Further disassembly may be performed in any convenient order, in accordance with the Drawings attached.

#### C. Assembly

- 14. To prepare the hydraulic hoist assembly for installation in its compartment, proceed as follows:
- (a) sink the plunger into the cylinder as far as it will go and bind them together by a cord, to prevent their shifting;
  - (b) remove plunger flange 51;
  - (c) remove flange with fork 47.
- 15. Lower the prepared hydraulic hoist assembly into its compartment through the openings in the foundation of guide bearing 4 (See Dwg No. 1) and in stanchion 9 of the pressure hull, and then place it on the top of the pressure hull tank in the bilge, beside the foundation.
- 16. Mount the following parts on the cylinder (39 and 48) of the hydraulio hoist (See Dwg. No. 3):
  - (a) gasket 46;
- (b) mast lower head 42 mounting shock absorber 41 and gasket 40.
- 17. Place in position upper head 10 (See Dwg No. 1) along with its assembled gland (parts 18, 19, 20, 21, 22; Dwg No. 2).

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- 18. Install flange with fork 47 (See Dwg No. 3) on the plunger and sorew on plunger flange 51 as far as it will go.
  - 19. Secure the plunger with locknut 53.
- 20 Install (roughly) the hydraulic hoist onto the foundation using adjusting spacers 50.
  - 21. Disconnect the plunger from the oylinder.
- 22. Install (roughly) guide bearing 4 (See Dwg No.1), without the centring bolts.
  - 23. Insert electric cable 8 into the mast tube.
- 24. Put the split-type fitting sleeve on the mast threaded end and coat it with grease.
- 25. Place the mast into guiding parts 4 and 10 so that the mast bottom is 0.5 metre above the normal DOWN position, and secure the mast by a yoke; when fitting the mast end onto the hydraulic hoist cylinder, put the electric cable into the recess of cylinder bottom 38 (See Dwg No. 3).
- 26. Remove the fitting sleeve and screw on mast lower head 42.
- 27. Turn the mast relative to the hydraulic hoist cylinder in accordance with the marking.
- 28. Insert the electric cable into the pipe union of the lower head and fit parts 43, 44 and 45 of the cable sealing in position.
- 29. Remove the yoke and lower the mast until it rests against shock absorber 2 (See Dwg No. 1) of upper guide boaring 4.
- 30. Turn flange with fork 47 (See Dwg No. 3) relative to the cylinder in accordance with the marking.
- 31. Tighten and secure the hydraulic hoist cylinder by means of flange with fork 47 on stude 49 of the mast lower head; then seal the cable gland located in the mast top section.
- 32. Test the mast lower head and the electric cable upper gland for leakage by air pressure of 1 kg/cm<sup>2</sup>, air boing pumped through opening for plug 61.

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- 33. Place in position guide bar 11 (See Dwg No. 1).
- 34. Mount upper and lower contactors 87 (Dwg No. 7) and 88 (Dwg No. 8) on the brackets, and fix electric cable socket 13 (Dwg No. 1) to the lug.
- 35. Finally secure guide bearing 4 (See Dwg No. 1) and plunger flange 51 (See Dwg No. 3) on the foundation.
- 36. Fix in position the line and fittings for tightening the upper head gland cups.
- 37. Connect the plunger to the hydraulic system line and fill the cylinder with oil, bleeding the air from the cylinder through needle plug 62.

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#### APPENDICES

## A. List of Drawings

| 140B | Description                          | Drawing No. |
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| 1    | Mast Hoisting Assembly               | 1           |
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#### B. List of Parts

| art | Description  |
|-----|--|
| 1   | 2  |
|     | Drawing No.1   |
| 1   | Receiving frame aerial   |
| 2   | Shock absorber, 140/190-mm dia., 18 mm high                    |
| 3   | Lubricator   |
| 4   | Upper bearing  |
| 5   | Spacer, 235/163 mm,5 mm thick                                  |
| 6   | Bushing, 110/125 mm, 120 mm long                               |
| 7   | Mast   |
| 8   | High-frequency cable   |
| 9   | Stanchion  |
| 10  | Upper head   |
| 11. | Guide bar and stop assembly                                    |
| 12  | Hydraulic hoist  |
| 13  | Six-pole socket  |
| 14  | Lug  |
| 15  | Three-way manipulator, 10-mm dia.,<br>P=100 kg/cm <sup>2</sup> |
|     | Drawing No. 2  |
| 16  | Upper head body  |
| 17  | Bushing with shoulder 110/130 mm, 70 mm long                   |
| 18  | Gland oup ring, B 110x140 mm                                   |
| 19  | Cup, 110x140 mm, type A  |
| 20  | Ring, 40x114 mm, 5 mm long                                     |
| 23. | Gasket, 238/178 mm, 3 mm thick                                 |
| 22  | Gland bushing  |

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|    |         | •      |
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| ·  | NO FOREIGN DISSEM                                      |  |  |  |  |
|----|--|--|--|--|--|
|    | - 2  |  |  |  |  |
| 1  | 2  |  |  |  |  |
| 23 | Pressure lubricator, 15-cu.cm. capacity                |  |  |  |  |
| 24 | Stop plate   |  |  |  |  |
| 25 | Slide block  |  |  |  |  |
| 26 | Cylindrical pin, 10                                    |  |  |  |  |
| 27 | Thrust ring  |  |  |  |  |
| 28 | Ring   |  |  |  |  |
| 29 | Handwheel, 432 mm                                      |  |  |  |  |
|    | Drawing No. 3  |  |  |  |  |
| 30 | Pipe union, 95;63 mm long                              |  |  |  |  |
| 31 | Gasket, 125/95, 4 mm thick                             |  |  |  |  |
| 32 | Gasket, 75/65, 1.5 mm thick                            |  |  |  |  |
| 33 | Flance   |  |  |  |  |
| 34 | Tolescopic mast  |  |  |  |  |
| 35 | Pipe, 10/2, 3,435 mm long                              |  |  |  |  |
| 36 | Pipe coupling  |  |  |  |  |
| 37 | Pipe union   |  |  |  |  |
| 38 | Cylinder bottom  |  |  |  |  |
| 39 | Pipe, 57-mm dia., 3.5-mm wall thickness, 3,203 mm long |  |  |  |  |
| 40 | Gasket, 92/104-mm dia., 2.5 mm thick                   |  |  |  |  |
| 41 | Shock absorber, 140/190-mm dia., 18 mm high            |  |  |  |  |
| 42 | Lower hoad body  |  |  |  |  |
| 43 | Washer, 43/28-mm dia.                                  |  |  |  |  |
| 44 | Packing, 7x7-nm cord, 480 mm long                      |  |  |  |  |
| 45 | Gland nut, 1M48x3                                      |  |  |  |  |
| 46 | Gasket, 160/125-mm dia., 3 mm thick                    |  |  |  |  |
| 47 | Flange with fork                                       |  |  |  |  |
| 48 | Flango   |  |  |  |  |
| 49 | Stud, M16x55, AN-K                                     |  |  |  |  |

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| 1  | 2  |
|----|--|
|    | and the light of t |
| 0  | Adjusting spacer, 122x49x8 mm  |
| 51 | Plunger flange   |
| 52 | Shank  |
| 3  | Locknut, 1M42  |
| 4  | Round nut  |
| 5  | Washer, 47/55-mm dia., 4 mm thick  |
| 6  | Cup, 45x65 mm, type A  |
| 7  | Gland cup ring, H45x65 mm  |
| 8  | Bushing with shoulder, 45x55x28 mm   |
| 9  | Screw, M8x12   |
| 0  | Plunger  |
| 1  | Plug -II, 1M16x1.5   |
| 2  | Needle plug  |
|    | Drawing No. 4  |
| 3  | Adjusting spacer   |
| 4  | Bracket  |
| 5  | Wedge guide  |
| б  | Wedge  |
| 7  | Guide bar  |
| 8  | Bushing  |
| 9  | Plate  |
| 0  | Boss   |
|    | Drawing No. 5  |
| 2  | Bronze straight-way cock, d=10 mm,P=25 kg/om <sup>2</sup>  |
| 3  | Pipe coupling, d=10 mm, P=100 kg/om <sup>2</sup>   |
| 4  | Pipe, 14x11 mm, L=1,000  |
| 5  | Pipe union, d=10 m 1M27x2  |
| 6  | Pressure lubricator, d=10 mm   |

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|    | -                                 |
|----|-----------------------------------|
|    |                                   |
| 1  | 2                                 |
|    | Drawing No. 6                     |
| 77 | Body                              |
| 78 | Axle                              |
| 79 | Cam                               |
| 80 | Slide valve                       |
| 81 | Scaling ring                      |
| 82 | Pressing nut                      |
| 83 | Ball bearing                      |
|    | Drawing No. 7                     |
| 84 | Pusher                            |
| 85 | lever                             |
| 86 | Bracket                           |
| 87 | Light signalling system contactor |
|    | Drawing No.8                      |
| 88 | Light signalling system contactor |
| 89 | Bar with eyes                     |
| 90 | Lever                             |
| 91 | Roller                            |
| 92 | Fork                              |
|    | Drawing No. 6 (cont.)             |

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Excluded from automatic
downgrading and
declassification

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96

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Valve

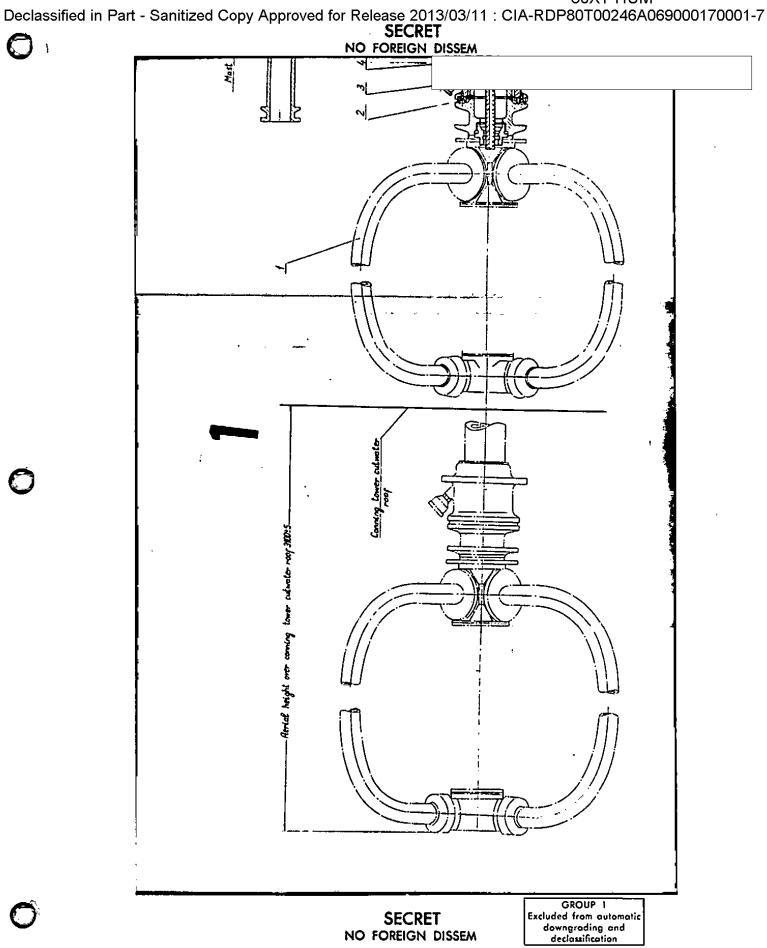
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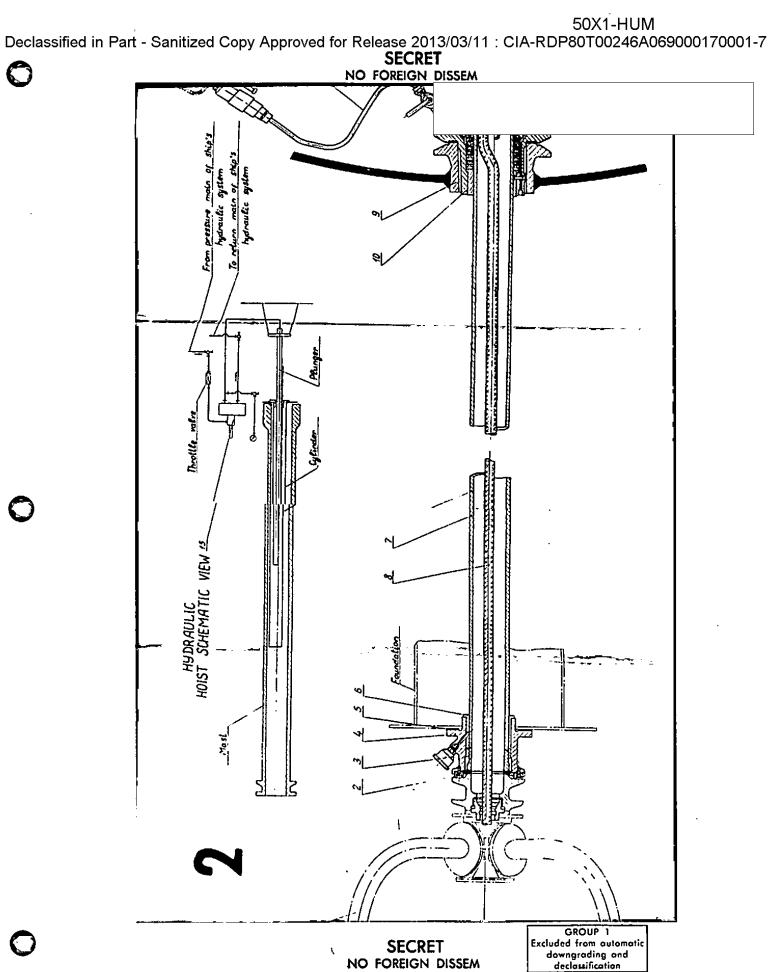
Eyes

Plate

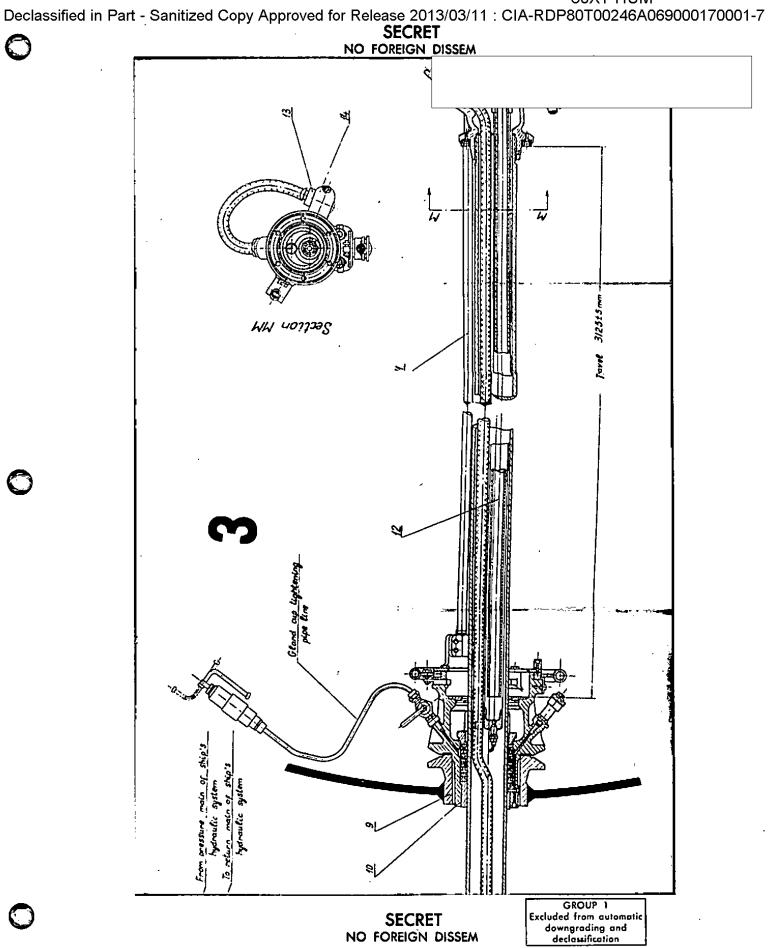
Throttle valve

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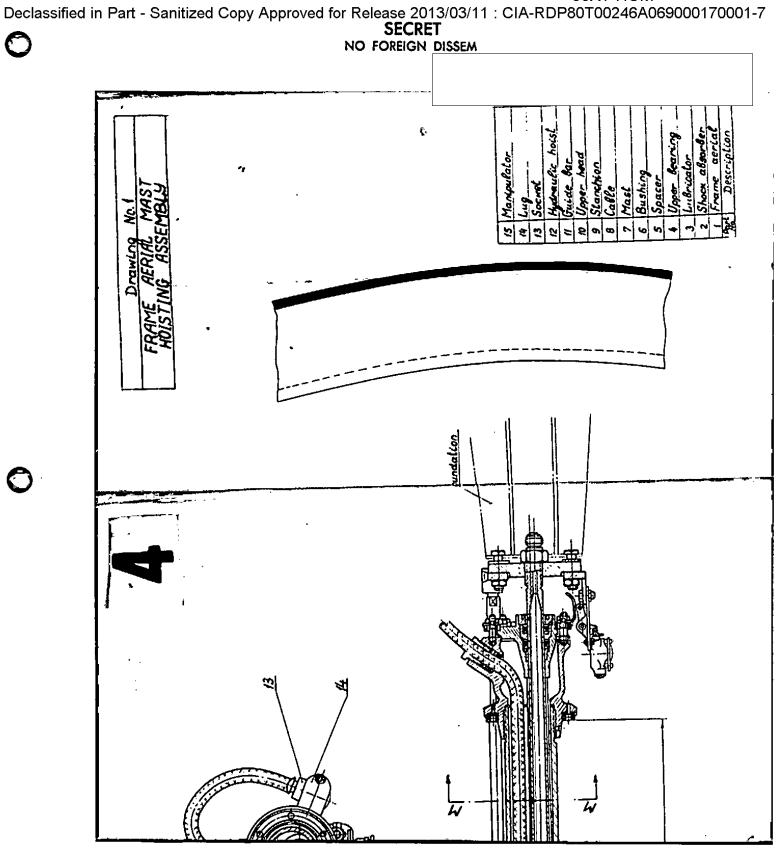




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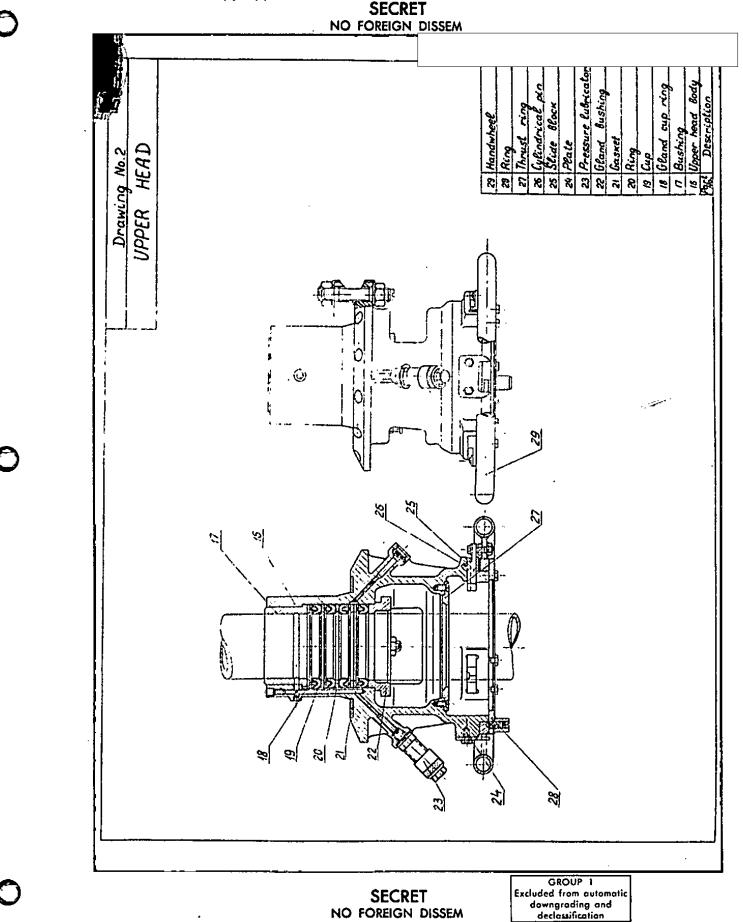


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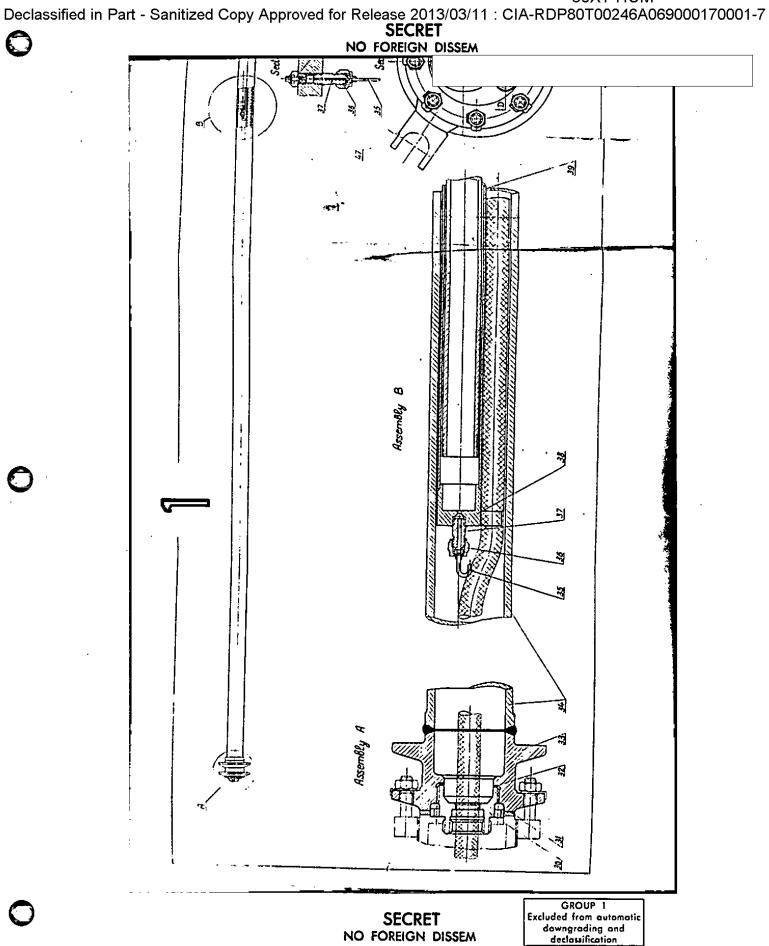
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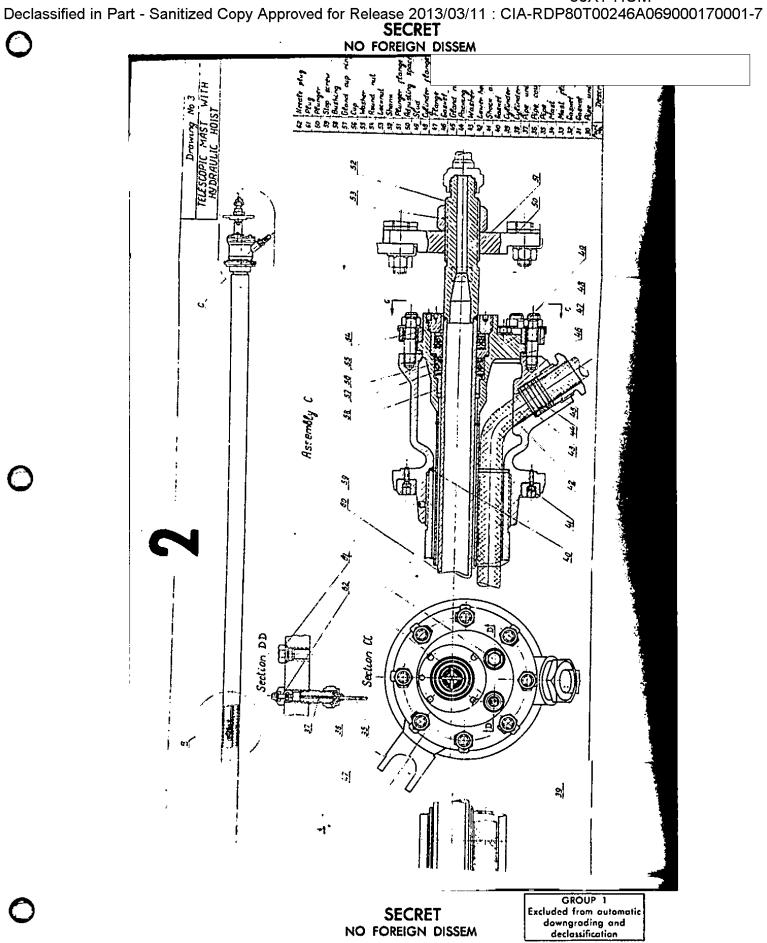
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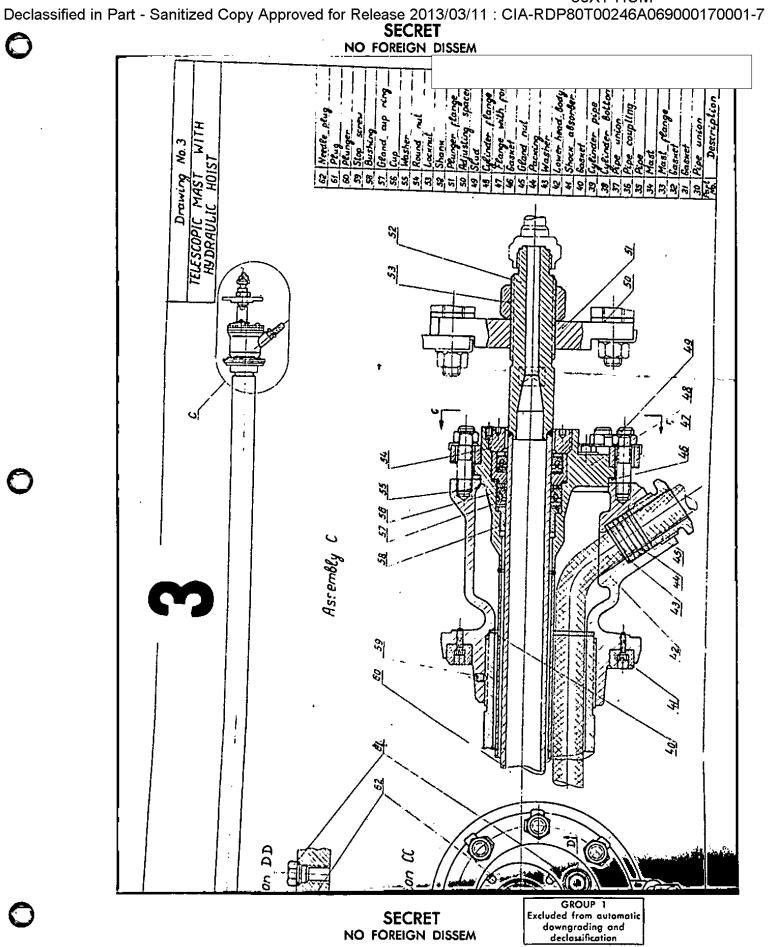
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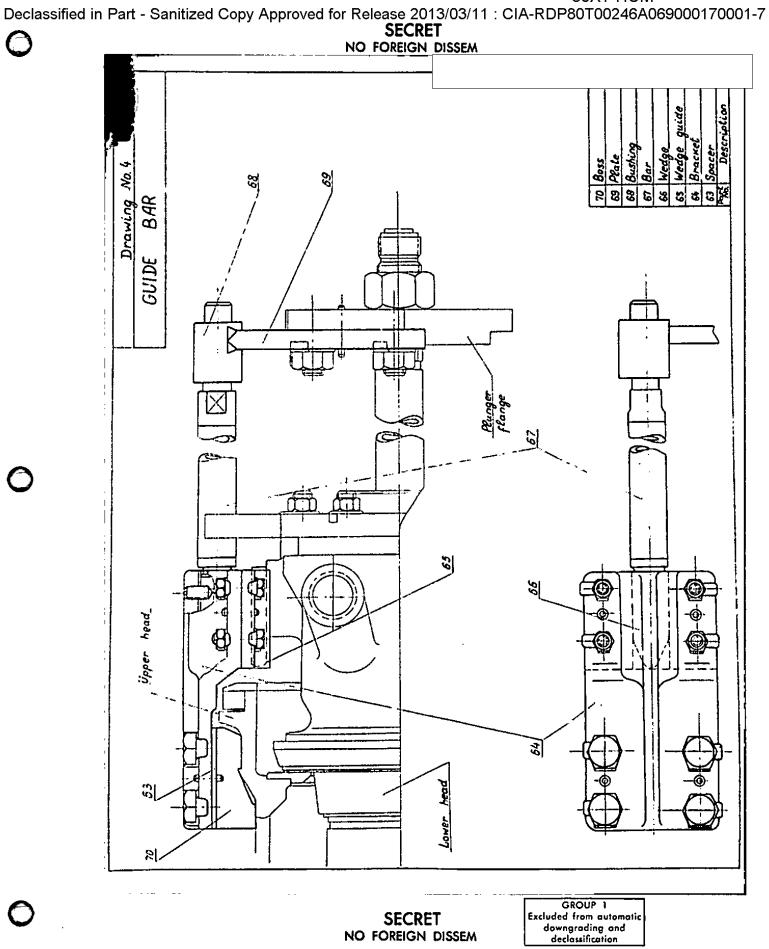
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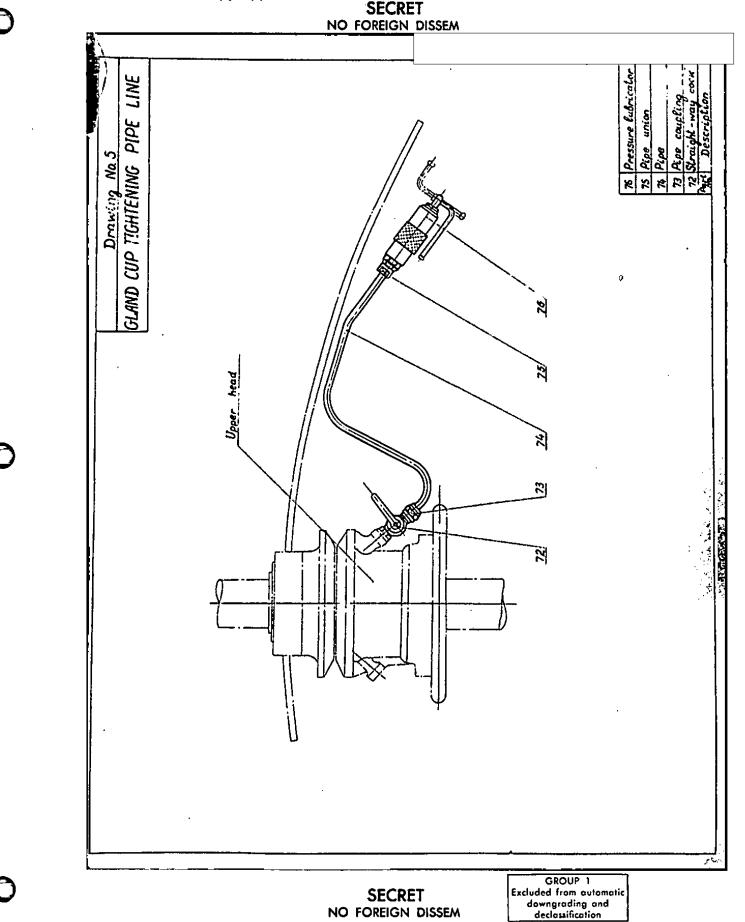
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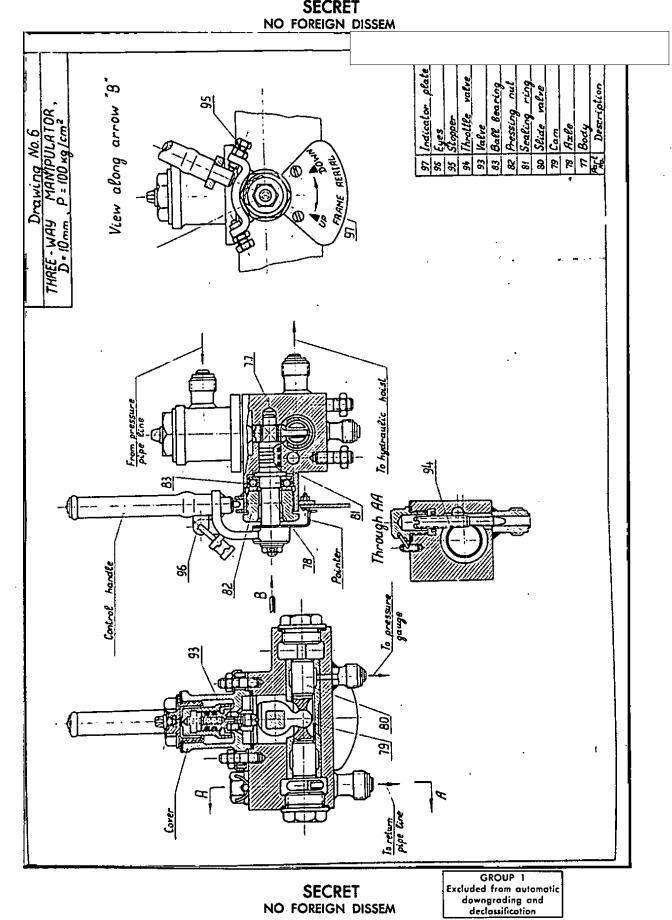
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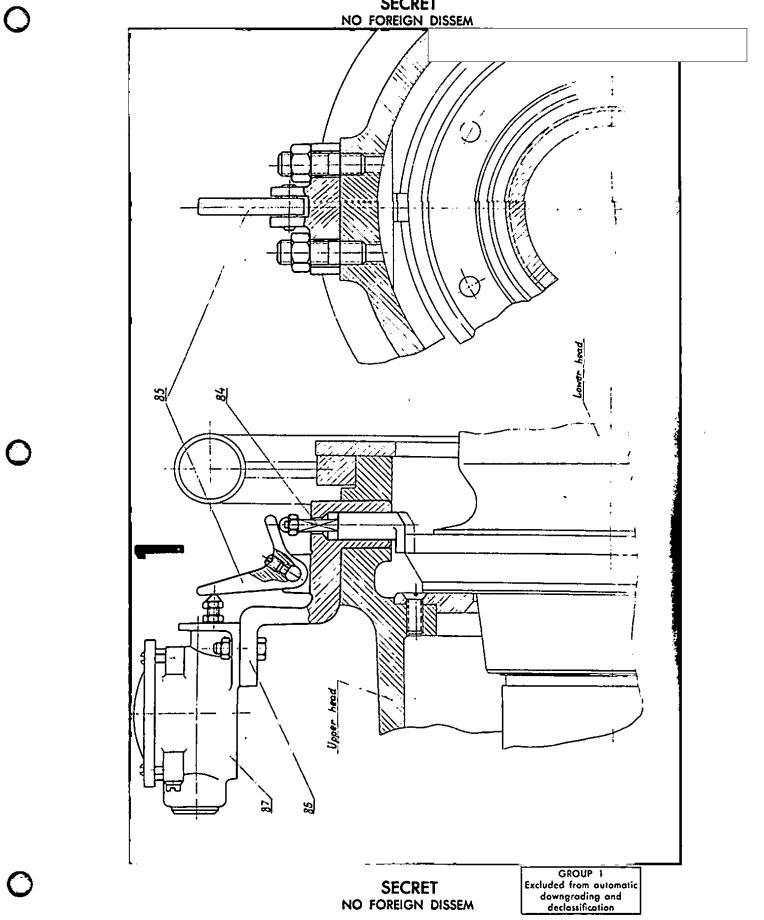
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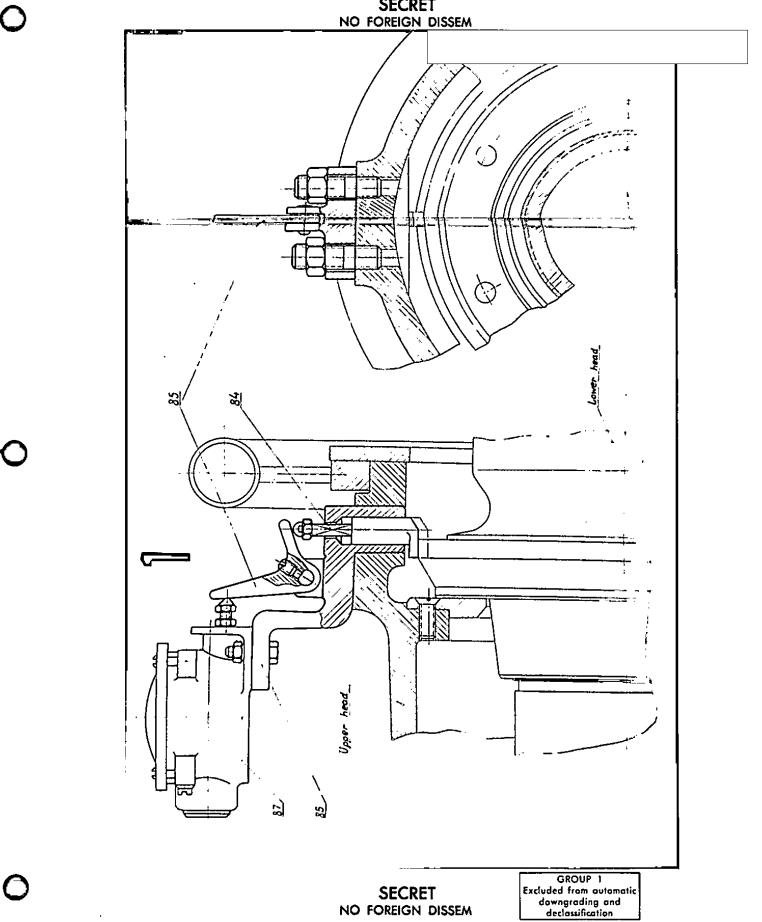
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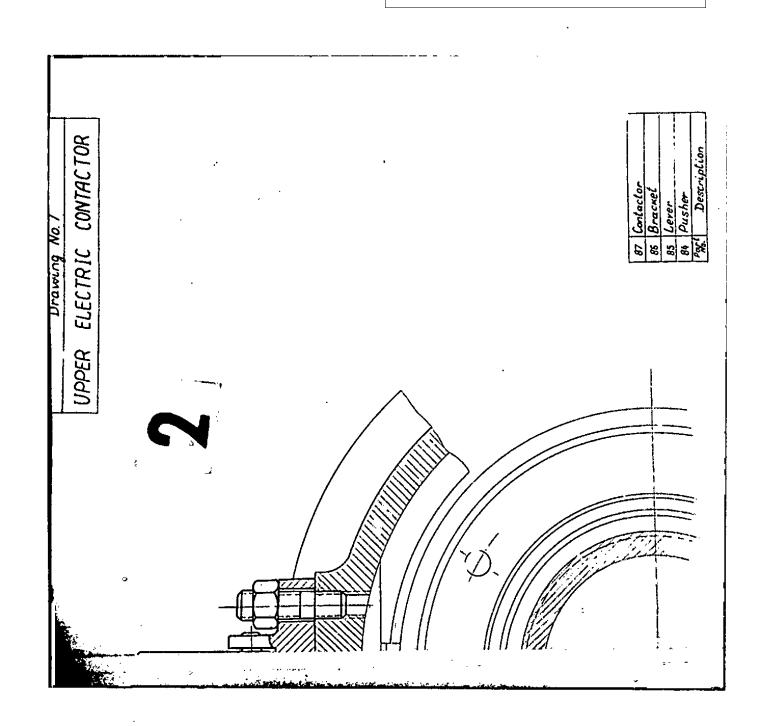
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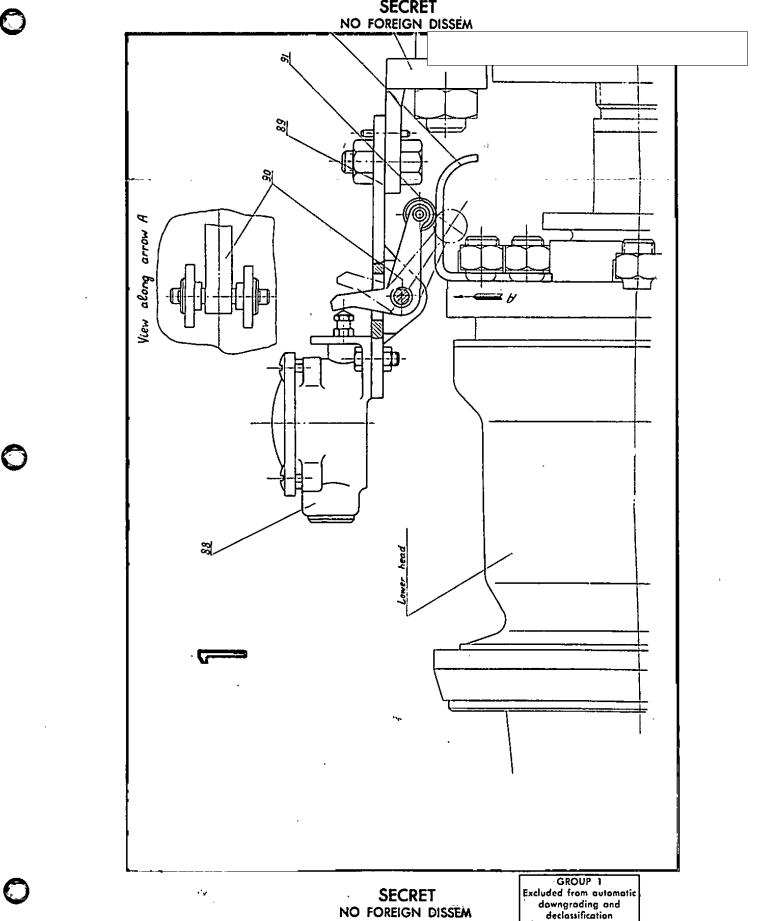
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